

## Data to the Knowledge of Pisciculous Parasites in the River Tisza

By

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From May till the end of December, 1962, I examined 385 fish specimens caught in two rather removed reaches of the river Tisza (Szeged, Poroszló), to ascertain their eventual parasites. The 385 fish studied belonged to 16 species. The quantitative rate of individuals of the examined species depended on the circumstances of occurrence, availability, and other factors.

I do not consider these studies as finished, either in a quantitative or in a qualitative relation. Hence I also desist from giving summary parasite faunistical statements. My purpose at present is merely to submit the results of my work made until now.

### TREMATODES

Fam.: Azygiidae ODHNER, 1911

*Azygia lucii* (MÜLLER, 1776) LÜHE, 1909

Syn.: *Fasciola lucii* MÜLLER, 1776; *Planaria lucii* (MÜLLER, 1776) GOEZE, 1782; *Distomum lucii* (MÜLLER, 1776) ZEDER, 1800; *Fasciola tereticollis* RUD., 1802; *Distoma tereticolle* (RUD., 1802) RUD., 1809; *Distoma rosaceum* NORDMANN, 1832; *Distoma tereticolle* (RUD.) of LOOSS, 1894; *Azygia tereticollis* (RUD., 1802) LOOSS, 1899; *Azygia loossi* MARSHALL et GILBERT, 1905; *Ptychogonimus volgensis* LINSTOW, 1907; *Distomum volgensis* (LINSTOW) of LÜHE, 1909; *Azygia volgensis* (LINSTOW) of ODHNER, 1911; *Azygia robusta*, ODHNER, 1911; *Azygia lucii johanseni* PAVLOV, 1931.

Hosts: *Esox lucius*, *Salmo alpinus*, *Salmo fario*, *Salmo hucho*, *Salmo salvelinus*, *Salmo trutta*, *Salmo salar*, *Thymallus thymallus*, *Lota lota*, *Lucioperca lucioperca*, *Lucioperca sandra*, *Acerina cernua*, *Perca fluviatilis*, *Nemachilus barbatulus*, *Salvelinus alpinus*, *Squalus cephalus*, *Acipenser* sp. — Localisation: intestinal canal.

Range: Soviet Union, Poland, Czechoslovakia, Germany, England, Hungary, North America.

Host in the Tisza: *Esox lucius*.

Extensivity: 1 occurrence in 18 examinations. Intensity: 1 specimen.

Coparasite: None.

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This fluke-worm belongs to the comparatively rare parasites of the fish in the Tisza. Of all examined specimens, only a single individual was found in one *Esox lucius*.

It belongs to the large-sized flukes. Its much elongated, slightly flattened body can exert strong movements. Suckers considerably developed, body surface smooth.

Sexual pore opening anteriorly of ventral sucker. Ovarium ellipsoid, smaller than testes. Uterine loops situated anteriorly of ovary. Testes in third body quarter. Yolk glands regularly spherical, situated laterally from intestinal branches and caudally from ventral sucker. Eggs comparatively small, shells yellowish brown.

Measurements in mm of collected *Azygia lucii* specimen:

Length of body	21,67	Greatest width	2,36
Oral sucker	$1,47 \times 1,53$	Ventral sucker	$1,08 \times 1,12$
Ovary	$0,66 \times 0,59$	Ovum	$0,047 \times 0,028$
Testis I	$0,74 \times 0,69$	Testis II	$0,88 \times 0,74$

Fam.: *Acanthocolpidae* LÜHE, 1909

### *Skrjabinopsolus skrjabini* OSMANOV, 1940

Hosts: *Huso huso*, *Acipenser gueldenstaedti*, *Acipenser stellatus*, *Acipenser ruthenus*. — Localisation: small and spiral intestine.

Range: Soviet Union (Crimea, Black Sea), Hungary.

Host in the Tisza: *Acipenser ruthenus*.

Extensivity: 4 occurrences in 19 examinations. Intensity: 1–5 specimens.

Coparasites: *Crepidostomum auriculatum* (WEDL, 1857) LÜHE, 1909; *Lep-torhynchoides plagicephalus* (WESTRUMB, 1897).

A rather frequent parasite of sturgeons in the Tisza. The value of invasion is low, more than 5 specimens were not found in a host specimen.

Rather smaller than medium, slightly flattened tubiform, rather little moving. Body surface densely squamose to ventral sucker. Termination obtusely rounded.

Testes in tandem position near extremity of body, shape regularly oval. Cirrus sac elongate, ejaculatory canal spinose. Ovary more or less spherical. Descendent branch of uterus filling second half of body. Inner surface of metraterm densely covered by inclinate spines. Sexual pore opening immediately anteriorly of ventral sucker, ringed with developed sphincter. Eggs light yellow. Yolk glands situated laterally of intestinal branches, between ventral sucker and second testis.

Measurements in mm collected *Skrjabinopsolus skrjabini* specimens:

Length of body	3,605	Greatest width	0,560
Oral sucker	$0,22 \times 0,26$	Ventral sucker	$0,20 \times 0,19$
Praepharynx	0,071	Pharynx	$0,18 \times 0,17$
Ovary	$0,15 \times 0,14$	Ovum	$0,052 \times 0,022$
Testis I	$0,27 \times 0,17$	Testis II	$0,32 \times 0,21$
Metraterm	$0,39 \times 0,15$	Cirrus sac	$0,45 \times 0,07$

***Allocreadium angusticolle* HAUSMANN, 1896**

Syn: *Distomum angusticolle* HAUSMANN, 1896; *Creadium angusticolle* LOOSS, 1899; *Peracreadium angusticolle* NICOLL, 1909.

Hosts: *Cottus gobio*, *Silurus glanis*. — Localisation: intestinal canal.

Range: Switzerland, Germany, Soviet Union, Hungary.

Host in the Tisza: *Silurus glanis*.

Extensivity: 1 occurrence in 19 examinations. Intensity: 12 specimens.

Coparasite: *Pomphorhynchus laevis* (MÜLLER, 1787).

A rare fluke of the sheatfish in the Tisza. Small-sized, dorso-ventrally flattened, rounded at both extremities. Surface smooth. Animal taken from intestine hardly moving. Suckers strong.

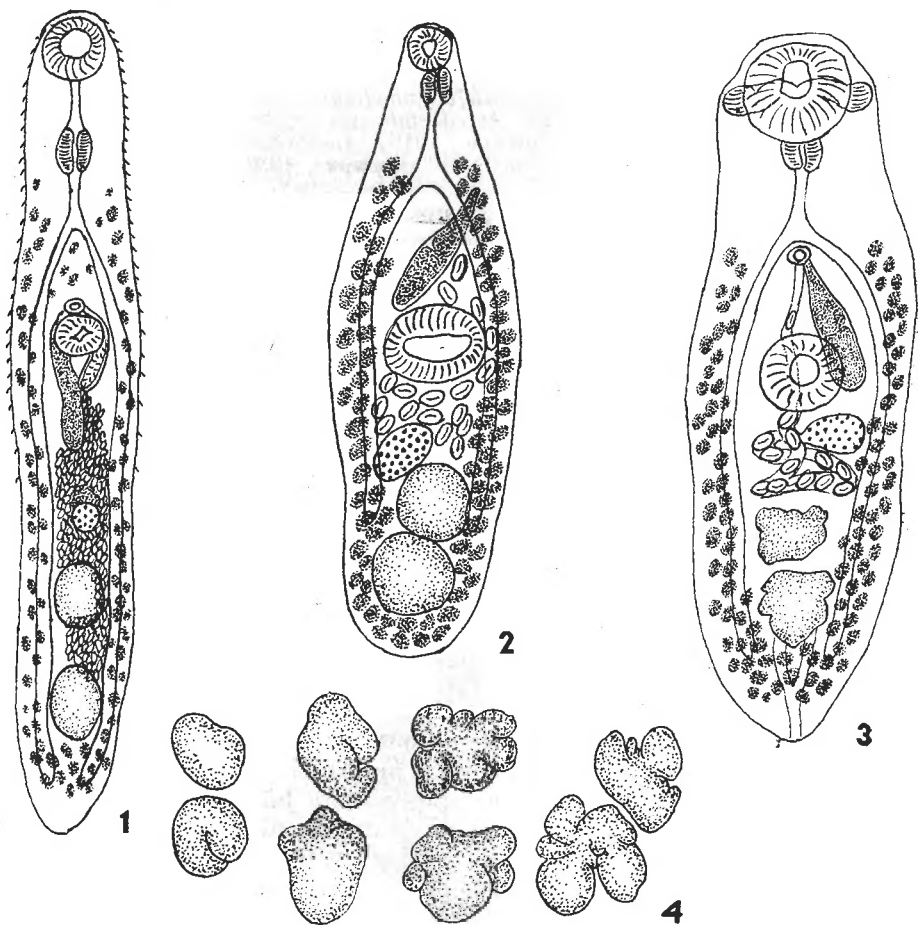


Fig. 1-4. 1: *Skrjabinopsolus skrjabini* (OSMANOV, 1940) from spiral canal of *Acipenser ruthenus*. — 2: *Allocreadium angusticolle* (HAUSMANN, 1896) from intestine of *Silurus glanis*. — 3: *Crepidostomum auriculatum* (WEDL, 1857) LÜHE, 1909, from intestine of *Acipenser ruthenus*. — 4: Diverse shapes of testes of *Crepidostomum auriculatum* (WEDL, 1857) LÜHE, 1909, of various ages: youngest (left), oldest worm (right)

Testes in a tandem position in fourth body quarter. Ovary situated anteriorly of testes, and smaller than they. Sexual pores opening on left of body, at border of second body quarter. Cirrus sac an elongate, oval tube. Uterus forming some transversal loops in front of ovary. Eggs large, golden yellow. Yolk glands extending from level of pharynx to extremity of body.

Measurements in mm of collected *Allocreadium angusticolle* specimens:

Length of body	1,409	Greatest width	0,500
Oral sucker	$0,15 \times 0,15$	Ventral sucker	$0,22 \times 0,27$
Pharynx	0,057	Oesophagus	0,042
Ovarium	$0,08 \times 0,14$	Ovum	$0,066 \times 0,048$
Testis I	$0,12 \times 0,15$	Testis II	$0,14 \times 0,14$

### ***Crepidostomum auriculatum* (WEDL, 1857) LÜHE, 1909**

Syn.: *Distoma auriculatum* WEDL, 1857; *Bunodera auriculata* LOOSS, 1902; *Crepidostomum auriculatum* LÜHE, 1909; *Acrodactyla auriculata* (WEDL) NICOLL, 1909; *Acrodactyla auriculata* (WEDL) ODHNER, 1910; *Acrolichanus auriculatus* (WEDL) SKWORTZOFF, 1927; *Acrolichanus similis* WISNIEWSKI, 1933.

Hosts: member of the family Acipenseridae. — Localisation: small and spiral intestine.

Range: Danube, Volga, Tisza, Oka, Yenisei, Lena rivers, and Lake Baykal.

Host in the Tisza: *Acipenser ruthenus*.

Extensivity: 19 occurrences in 19 examinations. Intensity: 8–79 specimens.

Coparasites: *Skrjabinopsolus skrjabini* OSMANOV, 1940; *Leptorhynchoides plagiccephalus* (WESTRUMB, 1897).

The most frequent parasite, occurring in masses, of the sturgeons in the river Tisza. It was found in every specimen of the examined 19 fish.

A member of the small-sized flukes. Anterior extremity of body obtuse, posterior one pointed. Body surface glabrous. Suckers strongly developed. Worm taken from intestine vividly moving, assuming most diverse forms.

Sexual pore opening anteriorly of ventral sucker, near bifurcation of intestinal branches. Uterine loops situated between testes and ventral sucker. Oval ovary beside ventral sucker. Yolk glands originating at level of intestinal bifurcation, extending laterally toward extremity of body, the two gland masses coalescing behind second testis. Testes situated in fourth body quarter, their surfaces lobate according to development of worm. Testes of quite juvenile animal sphaerical and smooth, older specimens with gradually less sphaerical and increasingly more lobate testes. Cirrus sac elongately oval, its posterior end reaching middle of ventral sucker. Number of eggs comparatively small, color golden yellow.

Measurements in mm of collected *Crepidostomum auriculatum* specimens:

Length of body	1,047	Greatest width	0,324
Oral sucker	$0,19 \times 0,21$	Ventral sucker	$0,15 \times 0,19$
Pharynx	$0,074 \times 0,072$	Oesophagus	0,048
Ovarium	$0,083 \times 0,090$	Ovum	$0,054 \times 0,030$
Testis I	$0,094 \times 0,123$	Testis II	$0,126 \times 0,135$

**Crowerocaeum skrjabini** (IWANITZKY, 1928)

Syn.: *Coitocaeum skrjabini* IWANITZKY, 1928; *Coitocaeum macrostomum* PIGULEVSKY, 1931; *Coitocaeum ovatum* PIGULEVSKY, 1931.

Hosts: *Acipenser stellatus*, *Leuciscus idus*, *Leuciscus cephalus*, *Scardinius erythrophthalmus*, *Aspius aspius*, *Tinca tinca*, *Chondrostoma nasus*, *Alburnus alburnus*, *Blicca bjoerkna*, *Abramis brama*, *Abramis sapa*, *Abramis balle-  
rus*, *Cyprinus carpio*, *Pelecus cultratus*, *Cobitis taenia*, *Nemachilus barbatulus*, *Silurus glanis*, *Esox lucius*, *Perca fluviatilis*, *Lucioperca lucioperca*, *Acerina cernua*, *Lota lota*, — Localisation: intestinal canal.

Range: SW rivers of Soviet Union, Hungary (Tisza).

Hosts in the Tisza: *Abramis brama*, *Silurus glanis*.

Extensivity: One specimen each in 61 examinations. Intensity: 3-14 speci-  
mens.

Coparasite: *Pomphorynchus laevis* (MÜLLER, 1787).

One of the rarer parasites of the fish species in the Tisza. A small-sized fluke, tubiform, anterior section gradually attenuating from ventral sucker. Body surface glabrous. Widest at level of ventral sucker. Animal taken from intestine hardly and very slowly moving.

Testes in tandem position in third one-third of body, surrounded by arc of intestinal branches. Shapes varying from glabrous sphaerical to elongate oval. Ovary situated immediately in front of them. Sexual pore opening

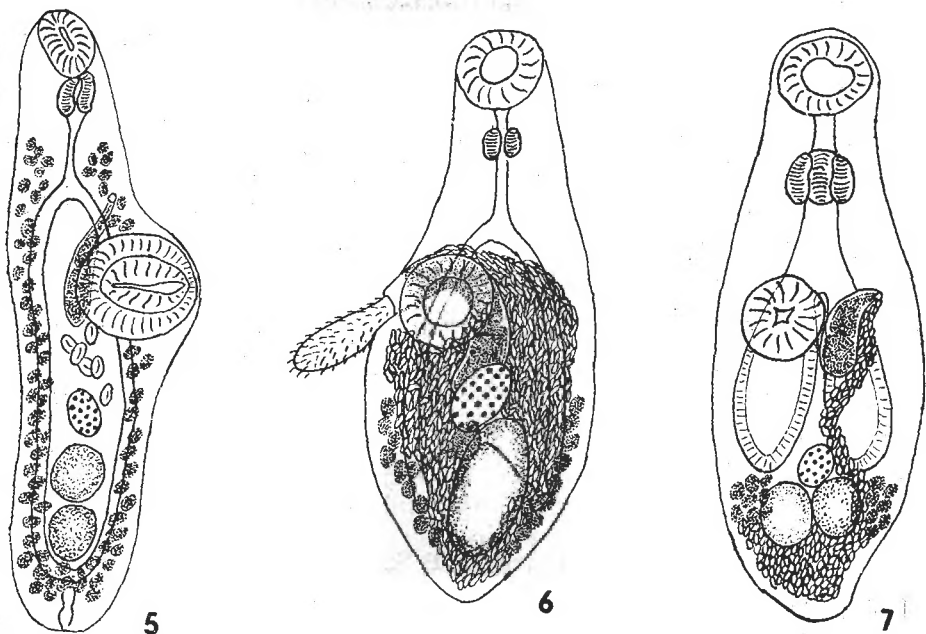


Fig. 5-7. 5: *Crowerocaeum skrjabini* (IWANITZKY, 1928) from intestine of *Silurus glanis*. — 6: *Asymphylodora imitans* (MÜHLING, 1898) from intestine of *Abramis brama*. — 7: *Palaeorchis incognitus* SZIDAT, 1943, from intestine of *Aspro zingel*

anteriorly of ventral sucker, laterally of intestinal branches. Cirrus sac elongate, posterior extremity extending beyond horizontal dividing line of ventral sucker. Comparatively small number of eggs largesized, yellowish brown. Yolk glands extending laterally, from level of oesophagus toward posterior extremity of body; bilateral gland masses confluent behind second testis.

Measurements in mm of collected *Crowcrocaecum skrjabini* specimens:

Length of body	1,215	Greatest width	0,360
Oral sucker	$0,15 \times 0,16$	Pharynx	$0,11 \times 0,13$
Ventral sucker	$0,26 \times 0,24$	Ovarium	$0,08 \times 0,15$
Ovum	$0,072 \times 0,048$	Testis I	$0,14 \times 0,16$
	Testis II		$0,16 \times 0,16$

Fam.: Monorchidae ODHNER, 1911

*Asymphylogora imitans* (MÜHLING, 1898)

Syn.: *Asymphylogora dneproviana* IWANITZKY, 1928.

Hosts: *Abramis brama*, *Abramis sapa*, *Blicca bjoerkna*. — Localisation: intestinal canal.

Range: Rivers of Europe, Israel.

Hosts in the Tisza: *Abramis*, *brama*, *Abramis sapa*.

Extensivity: 2 occurrences in 99 examinations. Intensity: 1–3 specimens.

Coparasite: *Pomphorhynchus laevis* (MÜLLER, 1787).

One of the rarest parasites in the fish of the Tisza. A small-sized fluke. Cranially attenuating, caudally slightly elongated oval. Body surface densely scaled. Suckers of medium size. The animal hardly moves when taken from the intestine.

Sexual pore opening at level of ventral sucker. All collected specimens were found with an extruded cirrus sac. Surface of cirrus densely spinose. Cirrus sac strongly developed, caudally reaching ovary. Unpaired, oval testis medially in fourth quarter of body; immediately behind ovary. Eggs light yellow, elongately pyriform, with a small, filamental appendage on wider extremity; narrower end topped by cap-like cover. Egg-masses almost entirely filling body cavity behind ventral sucker. Yolk glands situated laterally behind ventral sucker.

Measurements in mm of collected *Asymphylogora imitans* specimens:

Length of body	0,742	Greatest width	0,248
Oral sucker	$0,067 \times 0,067$	Ventral sucker	$0,120 \times 0,120$
Praepharynx	0,021	Pharynx	$0,028 \times 0,036$
Oesophagus	0,072	Ovarium	$0,095 \times 0,110$
Ovum	$0,066 \times 0,027$	Testis	$0,210 \times 0,090$
Length of cirrus	0,135	Width of cirrus	0,045

*Palaeorchis incognitus* SZIDAT, 1943

Hosts: *Rutilus rutilus*, *Aspro zingel*, *Blicca bjoerkna*. — Localisation: intestinal canal.

Range: Dnyepr, Bug, Dnyestr, Danube, Tisza.

Host in the Tisza: *Aspro zingel*.

Extensivity: 4 occurrences in 17 examinations. Intensity: 1–31 specimens. Coparasite: *Pomphorhynchus laevis* (MÜLLER, 1787); *Bunodera luciopercae* (O. F. MÜLLER, 1776).

A frequent parasite of *Aspro zingel* in the Tisza. It belongs to the smallest sized flukes, oval, attenuating at both ends. Body surface glabrous. Suckers weakly developed.

Sexual pore opening in a lateral position, at level of ventral sucker. Cirrus sac short, slightly curved, pyriform. Testes situated on both sides of median axis, in last fifth of body, at equal heights, immediately behind oval ovary. Groups of yolk glands laterally of testes, one group consisting of 7–9 follicles. Eggs extremely small, light yellow.

According to the observations of SZIDAT, it occurs rarely that there is only one testis present, and thus the animal resembles the genus *Asymphy-lodora*.

Measurements in mm of the collected *Palaeorchis incognitus* specimens:

Length of body	0,48–0,86	Oral sucker	0,060 × 0,080
Greatest width	0,26–0,38	Ventral sucker	0,088 × 0,060
Pharynx	0,040 × 0,060	Testis dext.	0,080 × 0,060
Ovarium	0,050 × 0,040	Testis sin.	0,090 × 0,060

Ovum 0,01 × 0,006

Fam.: *Bunoderidae* NICOLL, 1914

*Bunodera luciopercae* (O. F. MÜLLER, 1776)

Syn.: *Distomum nodulosum* ZEDER, 1800.

Hosts: *Esox lucius*, *Silurus glanis*, *Perca fluviatilis*, *Lucioperca lucioperca*, *Aspro zingel*, *Acerina cernua*. — Localisation: intestinal canal.

Range: Europe, Siberia, North America.

Host in the Tisza: *Aspro zingel*.

Extensivity: 2 occurrences in 17 examinations. Intensity: 2–11 specimens.

Coparasite: *Palaeorchis incognitus* SZIDAT, 1943.

It was found hitherto only in two instances in *Aspro zingel* in the fish of the Tisza. A small-sized fluke. Anteriorly attenuate, posteriorly widening, rounded. Suckers well developed. Oral sucker with six muscular appendages. Body surface smooth.

Sexual pore opening medially between ventral sucker and bifurcation of intestinal branches. Cirrus sac extending below ventral sucker. Enormously developed testes wellnigh filling second half of body. Ovary situated beside caudal margin of ventral sucker. Yolk glands situated laterally, extending from pharynx to middle of second testis. Eggs dark brownish yellow.

Measurements in mm of collected *Bunodera luciopercae* (O. F. MÜLLER, 1776) specimens:

Length of body	2,16	Greatest width	0,855
Oral sucker	0,34 × 0,42	Ventral sucker	0,32 × 0,39
Ovarium	0,12 × 0,15	Ovum	0,108 × 0,060
Testis I	0,54 × 0,51	Testis II	0,67 × 0,54

## CESTOIDEA

Fam.: Amphilinidae CLAUS, 1879

### *Amphilina foliacea* (RUDOLPHI, 1819)

Syn.: *Monostomum foliaceum* RUDOLPHI, 1819.

Hosts: members of the family Acipenseridae. — Localisation: body cavity.

Range: Danube, Dnyestr, Volga, Kur, Angara, Ob, Yenisei, Amur, Tisza.

A phylliform Cestod, convex dorsally, flattened ventrally. When liberated from body cavity of host, vividly moving.

Male sexual opening situated terminally in median line. Vagina opening near posterior extremity of body. Ovary strongly articulate. Uterus forming three longitudinal trunks. Yolk glands fasciculate, situated laterally. Testes scattered, about 150 in number. Eggs rounded oval, measurements  $0,105-0,115 \times 0,063-0,075$  mm.

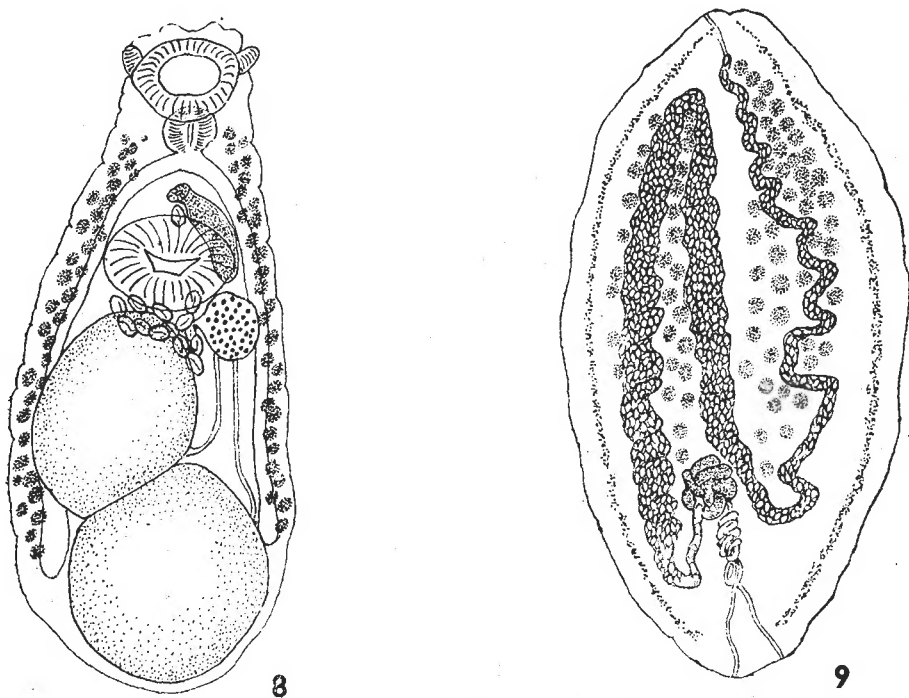


Fig. 8-9. 8: *Bunoder lucioeperae* (O. F. MÜLLER, 1776), from intestine of *Aspro zingel*. — 9: *Amphilina foliacea* (RUDOLPHI, 1819) from body cavity of *Acipenser ruthenus*



Fam.: *Ichthyotaeniidae* ARIOLA, 1899

***Ichthyotaenia osculata* (GOEZE, 1782)**

Syn.: *Proteocephalus osculatus* (GOEZE, 1872).

Hosts: *Silurus glanis*. — Localisation: intestinal canal.

Range: Soviet Union, Tisza.

Host in the Tisza: *Silurus glanis*.

Extensivity: 1 occurrence in 21 examinations. Intensity: 7 specimens.

Coparasite: *Pomphorhynchus laevis* (MÜLLER, 1787).

A characteristic parasite from the suborder Cestoda of the sheatfish. The collected specimens were rather young, 7–12 cm long and 1,5 mm wide.

Number of testes 140–150. Uterus with 6–8 lateral branches. Diameter of eggs 0,014–0,016 mm.

Fam.: *Amphycotylidae* NYBELIN, 1922

***Eubothrium crassum* (BLOCH, 1779)**

Syn.: *Taenia crassa* BLOCH, 1779; *Bothriocephalus infundibuliformis* RUD., 1809; *Bothriocephalus proboscideus* RUDOLPHI, 1809; *Abothrium longissimum* CHOŁODOWSKY, 1918; *Eubothrium oncorhynchi* WARDLE, 1932.

Hosts: members of the family Salmonidae. — Localisation: intestinal canal.

Range: Europe, North Asia, North America.

Host in the Tisza: *Barbus barbus*.

Extensivity: 1 occurrence in 25 examinations. Intensity: 1 specimen.

Coparasite: *Pomphorhynchus laevis* (MÜLLER, 1787).

*Eubothrium crassum* is a typical intestinal parasite of the salmon. The specimen under discussion was collected from the intestine of a barbel. The animal was a juvenile specimen, 3,5 cm long, 1,0 mm wide.

Fam.: *Caryophyllaeidae* LEUCKART, 1878

***Caryophyllaeus laticeps* (PALLAS, 1781)**

Syn.: *Caryophyllaeus mutabilis* RUDOLPHI, ....

Hosts: members of the family Cyprinidae. — Localisation: intestinal canal.

Range: Danube, Dnyestr, Bug, Dnyep, Don, Volga, Amur, Tisza.

Host in the Tisza: *Barbus barbus*.

Extensivity: 4 occurrences in 25 examinations. Intensity: 6–147 specimens.

Coparasite: *Pomphorhynchus laevis* (MÜLLER, 1787).

One of the very abundantly occurring parasites of the barbels in the Tisza. I found the maximum parasitisation in a 0,75 kg *Barbus barbus*, infected by 147 *Caryophyllaeus*.

Length 20–40 mm, width 1,5–2,0 mm. Number of testes 350–400. Dimensions of egg 0,060–0,040 mm.

Fam.: *Triaenophoridae* LOENNBERG, 1889

***Triaenophorus lucii* (MÜLLER, 1776)**

Syn.: *Triaenophorus tricuspidatus* (BLOCH, 1779); *Triaenophorus nodulosus* (PALLAS, 1781) RUDOLPHI, 1793.

Hosts: *Salmo fario*, *Salmo lacustris*, *Thymallus thymallus*, *Coregonus fera*, *Esox lucius*, *Perca fluviatilis*, *Alburnus alburnus*, *Gobio gobio*, *Anguilla anguilla*. — Localisation: intestinal canal.

Range: Europe, North Asia, North America.

Host in the Tisza: *Esox lucius*.

Extensivity: 1 occurrence in 18 examinations.

Intensity: 2 specimens.

The collected specimens were 9–12 cm long and 2,5–4 mm wide. Scolex about twice as long as wide, with four strongly developed hooks, two external branches curved like horns of buffalo, their height about 0,110 mm, width 0,090 mm. Dimension of eggs 0,050×0,030 mm.

NEMATODA

Fam.: *Camallanidae* RAILLIET-HENRY, 1917

***Camallanus lacustris* (ZOEGER, 1776)**

Syn.: *Cucullanus elegans* ZEDER

Hosts: *Perca fluviatilis*, *Acerina cernua*, *Lucioperca lucioperca*, *Esox lucius*, *Lota lota*, *Silurus glanis*. — Localisation: intestinal canal.

Range: rivers of N and E Europe and N Asia.

Host in the Tisza: *Lucioperca lucioperca*.

Extensivity: 3 occurrences in 16 examinations. Intensity: 2–5 specimens.

Coparasite: none.

Body pale reddish pink. Oral capsule and ribbing a striking yellowish brown. Male 5–8 mm long, with only one spiculum and one gubernaculum; seven pairs of praeanal and six pairs of postanal papillae. Female 12–20 mm long, vulva opening in middle of body or slightly behind it.

ACANTHOCEPHALA

Fam.: *Rhadinorhynchidae* TRAVASSOS, 1923

***Leptorhynchoides plagicephalus* (WESTRUMB, 1897)**

Syn.: *Echinorhynchus plagicephalus* WESTRUMB

Hosts: members of the family Acipenseridae. — Localisation: intestinal canal.

Range: tributaries of the Caspian and Black Seas.

Host in the Tisza: *Acipenser ruthenus*.

Extensivity: 3 occurrences in 19 examinations. Intensity: 3–133 specimens.

Coparasites: *Crepidostomum euriculatum* (WEDL, 1857) LÜHE, 1909; *Skrjabinopsolus skrjabini* OSMANOV, 1940.

A comparatively rare parasite, but occurring in great intensity in the sturgeons of the Tisza. Length fluctuating between 10–28 mm. Males generally smaller, their greatest width attaining 2 mm; proboscis 2–2,5 mm long, with 14 longitudinal series of hooks, about 20 hook per row; lemnisci fili-form, extending to middle of body. Length of eggs 0,140–0,160 mm, width 0,030–0,040 mm.

Fam.: *Echinorhynchidae* COBBOLD, 1879

***Pomphorhynchus laevis* (MÜLLER, 1787)**

Syn.: *Echinorhynchus proteus* WESTRUMB

Hosts: *Barbus barbus*, *Aspius aspius*, *Rutilus rutilus*, *Silurus glanis*, *Acipenser ruthenus*.

Localisation: intestinal canal.

Range: Tributaries of White, Baltic, Black and Caspian Seas.

Hosts in the Tisza: *Abramis brama*, *Abramis sapa*, *Barbus barbus*, *Silurus glanis*, *Aspro zingel*, *Pelecus cul-tratus*.

Extensivity: 46 occurrences in 153 examinations. Intensity: 2–147 specimens.

Coparasites: *Allocreadium angusticolle* (HAUSMANN, 1896); *Palaeorchis incognitus* SZIDAT, 1943; *Crowcro-caecum skrjabini* IWANITZKY, 1928; *Caryophyllaeus laticeps* (PALLAS, 1791); *Asymphyllodora imitans* (MÜHLING, 1898); *Ichthyolaenia osculata* (GÖTZE, 1782); *Eubolthrium crassum* (BLOCH, 1779).

The commonest parasite of fish in the Tisza. In anterior section of body, bulbus situated on a 2–3 mm long neck; bulbus terminally with proboscis, bearing 18–20 longitudinal rows of 11–12 hooks each. First 5 hooks of rows more developed than rest. Males 6–8 mm long, females 10–30 mm long. Greatest width 2,5–3 mm. Length of eggs 0,066 mm, width 0,013 mm.

At its place of attachment, the worm penetrates with the anterior part of its body so deep into the intestinal wall that it frequently bores through it and becomes then visible as a colorless bulge on the outer surface of the gut.

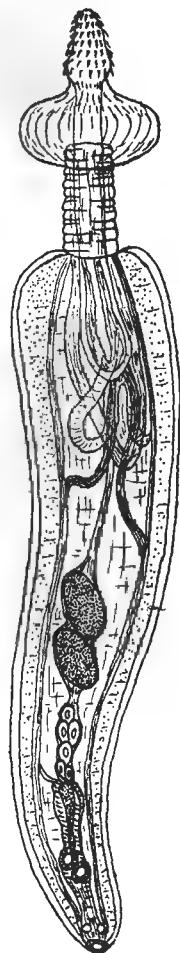
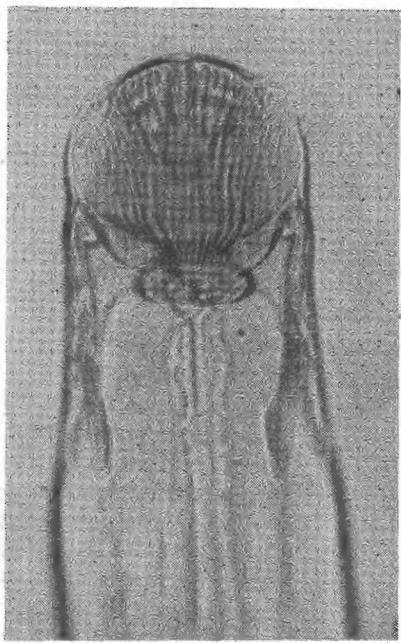
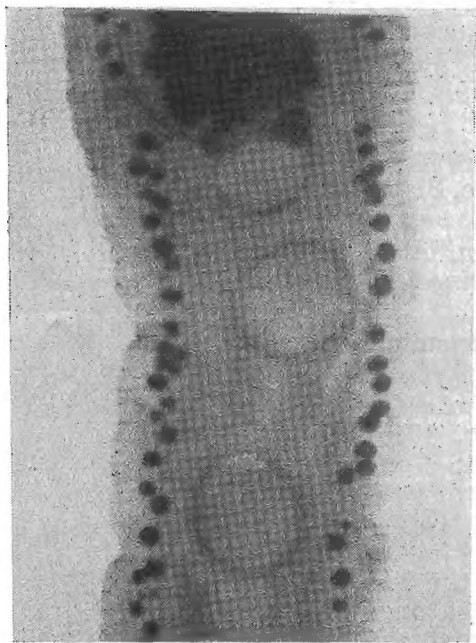
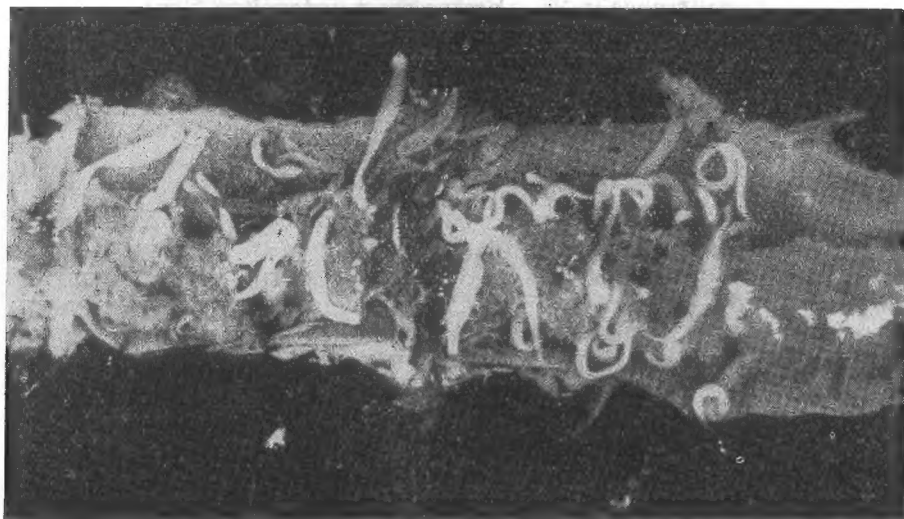
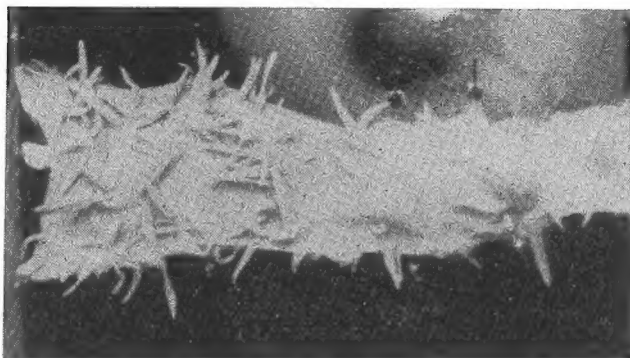


Fig. 10. Male *Pomphorhynchus laevis* (MÜLLER, 1787) specimen from intestine of *Abramis brama*



Left: *Azygia lucii* (MÜLLER, 1776) from intestine of *Esox lucius*. Section of body with sexual glands. — Right: *Camallanus lacutris* (ZOEGER, 1776) from intestine of *Lucioperca lucioperca*



Upper: Mass occurrence of *Pomphorhynchus laevis* (MÜLLER, 1787) in intestine of *Barbus barbus*. — Lower: Common occurrence of *Caryophyllaeus laticeps* (PALLAS, 1781) and *Pomphorhynchus laevis* (MÜLLER, 1787) in intestine of *Barbus barbus*

## CRUSTACEA

Fam.: Ergasilidae THORELL, 1859

### *Ergasilus sieboldi* NORDMANN, 1832

Localisation: branchial gills (plates).

Range: Europe, North Asia.

Hosts in the Tisza: *Abramis brama*, *Abramis sapa*, *Esox lucius*.

Extensivity: 4 occurrences in 111 examinations. Intensity: 2-16 specimens.

I found the greatest number on the branchial plates of an *Abramis brama* specimen. Length 1-1,5 mm, greatest width 1 mm.

Fam.: Lernaeidae WILSON, 1915

### *Lernaea cyprinacea* LINNEUS, 1758

Localisation: body surface.

Range: Europe, W Siberia.

Host in the Tisza: *Carassius carassius*.

Extensivity: 1 occurrence in 21 examinations. Intensity: 1 specimen.

One specimen found on the dorsal side of a crucian carp. Length 17 mm.

## Summary

The results of the study can be summarized as follows:

1. The following 15 species had been shown as new for the fauna of Hungary: *Azygia lucii* (MÜLLER, 1776); *Skrjabinopsolus skrjabini* OSMANOV, 1940; *Allocreadium angusticollae* (HAUSMANN, 1896); *Crepidostomum auriculatum* (WEDL, 1857) LÜHE, 1909; *Crowcrocaecum skrjabini* (IWANOTZKY, 1928); *Asymphylogdora imitans* (MÜHLING, 1818); *Palaeorchis incognitus* SZIDAT, 1943; *Bunodera luciopercae* (MÜLLER, 1776); *Amphilina joliacea* (RUDOLPHI, 1819); *Eubothrium crassum* (BLOCH, 1779); *Caryophyllaeus laticeps* (PALLAS, 1781); *Trienophorus lucii* (MÜLLER, 1776); *Camallanus lacustris* (ZOEGER, 1776); *Leptorhynchoides plagicephalus* (WESTRUMB, 1821); *Pomphorhynchus laevis* (MÜLLER, 1787).

2. The following fish species of the Tisza show the greatest rate of infection by parasites: *Acipenser ruthenus* (100%), *Aspro zingel* (82,3%), *Barbus barbus* (76,0%).

3. The most frequent parasites, occurring also most abundantly, were found primarily in the classis Acanthocephala, and only secondarily in Trematodes.

4. The most frequent parasites, of also the highest infection rate, are *Pomphorhynchus laevis* (MÜLLER, 1787), *Crepidostomum auriculatum* (WEDL, 1857) LÜHE, 1909, and *Caryophyllaeus laticeps* (PALLAS, 1791).

5. The parasite *Pomphorhynchus laevis* (MÜLLER, 1787) has the greatest distribution, found in six fish species.

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